

AR35



**General Motors  
of Canada  
and our  
ENVIRONMENT**



# Protecting and Preserving our Environment

General Motors of Canada Limited is the largest automotive manufacturer in this country, with 12 vehicle and locomotive assembly plants and automotive component plants in Oshawa, St. Catharines, Scarborough, Windsor and London, Ontario and Ste. Therese, Quebec. Including Business Development Centres, Parts Distribution Centres and other GM facilities across Canada, we employ almost 44,000 men and women.

As concerns for the environment mount, GM of Canada continues to demonstrate that we share those concerns with our employees – and with all Canadians – by taking a leading role in protecting and preserving our land, sea and air resources. We believe in, and are committed to, sustainable development: Growth today, without damaging the future.

Product enhancements and plant improvements which achieve reductions in emissions and solid wastes are among the techniques employed in support of this. General Motors

was the first to introduce a full line of automobiles operating entirely on unleaded fuels and pioneered the use of catalytic converters on vehicle exhaust systems. Emissions from our cars and light duty trucks are now reduced by 90 percent, on average, from precontrol levels.

New paint technologies in our Oshawa Truck and Ste. Therese plants significantly reduce emissions of volatile organic compounds to the environment. And chlorofluorocarbon (CFC) recycling units used by Cadillac, Pontiac-Buick, Chevrolet-Oldsmobile and Passport International dealers during service of vehicle air conditioners reduce the potential loss of ozone from the stratosphere.

In a further important move, GM has added to its remanufacturing efforts by introducing GMX, a product line featuring used General Motors parts, remanufactured to GM-approved specifications. Parts which might otherwise have been scrapped are now





completely remanufactured and offered, as an alternative to new parts, to customers at GM dealerships in Canada.

Pyrolysis, a method for recycling the sheet moulding compounds (SMCs) used in the manufacture of GM's new Chevrolet Lumina APV and Pontiac Trans Sport minivans and Chevrolet Corvettes, is also being developed by GM. SMCs contribute to enhanced durability, reduce corrosion and provide longer vehicle life.

Training is critical to successful waste management and pollution control. A core group of GM employees has graduated from an environmental certification course sponsored by York University. We have established an Environment Committee composed of many of these environmental officers to ensure responsible environmental management in our plants.

In developing our new administration building on the shore of Lake Ontario in Oshawa, GM of Canada worked closely with Wildlife Habitat Canada, the Second Marsh Defence

League, the Central Lake Ontario Conservation Authority, and various environmental engineering firms to ensure that the integrity of the local environment would not be compromised. The building and property have been carefully engineered to ensure that nature will be protected and enjoyed. The building was specially designed not to interfere with the flight path of migrating birds and a storm water control system has been built along the edge of the property to protect the neighboring Second Marsh from any runoff from our property. The climate control within the building is centred around a state-of-the-art ice storage air-conditioning system that cuts the amount of CFCs required by almost half. This is the first such system to be implemented in Canada.

We will continue to vigorously pursue new ways to enhance our commitment to sustainable development for the benefit of present and future generations. We are proud of what we have accomplished so far, and we will continue to work toward a cleaner Canada.





# Preserving the Ozone Layer



Photo By Jon Schill

*A GM Technician demonstrating the new CFC Recycling and Recovery unit on a Scarborough-built GMC extended van.*

General Motors of Canada is now involved in a coordinated corporate effort to not only reduce chlorofluorocarbon (CFC) emissions but also to develop alternatives to these compounds. In recent years the world has become increasingly aware of – and particularly sensitive to – the damage being done to the fragile ozone layer which provides protection from the sun's harmful ultraviolet rays. Evidence points to CFCs as being among the offenders.

Chlorine, fluorine and carbon atoms are contained in CFCs, which are used as refrigerants in household appliances, buildings and vehicle air conditioners, in production of industrial solvents and foam products and, until recently, as propellants in aerosol sprays. When contained, CFCs are non-reactive, non-toxic, safe and stable compounds. Liberated into the free air, however, some CFC molecules rise into the stratosphere and release chlorine through the sun's heat energy. The chlorine then reacts with the ozone to convert that protective layer into ordinary oxygen, exposing the earth to increased levels of ultraviolet rays.

In recognition of this, and in a significant step to reduce CFC emissions, GM of Canada anticipates phasing out the use of CFCs in vehicle air conditioners, beginning in 1993. Meanwhile, we became the first automotive manufacturer to begin placing recycling equipment in our dealerships which will prevent freon (CFC-12) from being vented into the atmosphere during service or routine maintenance of automotive air conditioning units. All Cadillac, Pontiac-Buick, Chevrolet-Oldsmobile and Passport International dealers servicing vehicle air conditioners in Canada — along with our assembly plants and test facilities — will help reduce CFC emissions by using this new equipment to capture and purify the freon for re-use, rather than allowing it to escape and become a potentially destructive agent.

Protection of the ozone layer is a most important priority for General Motors of Canada in its concern for the natural environment, and we support the Montreal Protocol, an international agreement to control substances (such as CFCs) depleting the ozone layer.



# Reducing Vehicle Emissions

General Motors' scientists and engineers have made numerous important advances in controlling vehicle emissions.

Today's cars contain emission control systems which have reduced emissions 90 percent on average from precontrol levels.

Testing done on GM vehicles shows emissions of hydrocarbons have been reduced 96 percent from precontrol levels. An overall reduction in carbon monoxides of 96 percent and a reduction of nitrogen oxides by 76 percent from precontrol levels have also been achieved. As newer vehicles replace older ones, overall emissions will decrease substantially.

These reductions in emissions are achieved through a number of technologies including catalytic converters, Positive Crankcase Ventilation, closed loop emission controls, fuel injection, electronic ignition, exhaust

gas recirculation, and air injection.

General Motors supports the use of properly blended oxygenated fuels, such as methanol and ethanol. Motor gasolines that contain low levels of oxygenates not only improve octane levels, but may also reduce carbon monoxide emissions from vehicles.

We are continuing to pursue new technologies and new products to improve auto emissions and air quality. You can help too. Always use unleaded gasolines or recommended oxygenated fuels as described in your owner's manual. Have your vehicle serviced regularly to ensure that it is in top running order. Maintain your tires at the recommended pressure. If each one of us takes these small steps, the overall result will be a cleaner Canada.

## CLEANER TOMORROW...

Between now and 2000, the overall fleet of cars and trucks on Canadian roads will get "cleaner" as new vehicles replace old, less efficient models.



HC

HYDROCARBONS

96%

CO

CARBON MONOXIDE

96%

NOx

NITROGEN OXIDES

76%



The chart shows how innovative technology has reduced emissions between 1977 and today.



## Alternative Fuels

The challenge to develop alternative transportation fuels, spurred by environmental concerns over fossil fuels, is being met through a number of important initiatives at GM of Canada, a principal one being the methanol program. Methanol is made from natural gas and Canada is one of the largest suppliers in the world, exporting 85 percent of its production to world markets. While it may eventually prove to be an effective tool in achieving cleaner air in North America's large cities, a number of important environmental, mechanical and distribution ques-

tions remain to be solved. General Motors of Canada is working hard to find the answers.

Twenty Chevrolet Corsicas have been refitted by GM to operate on a range of methanol/gasoline mixtures and GM of Canada is producing 2,200 Chevrolet Luminas in Oshawa for demonstration in Southern California, which has the most severe urban smog problems in North America. To ensure reliability in all operating conditions, these cars are being tested at GM's Cold Weather Development Centre in Kapuskasing, Ontario, the Arizona Desert Proving Grounds and the



*General Motors of Canada's Alternative Fuels Team, with the Oshawa-built methanol-powered Chevrolet Lumina.*

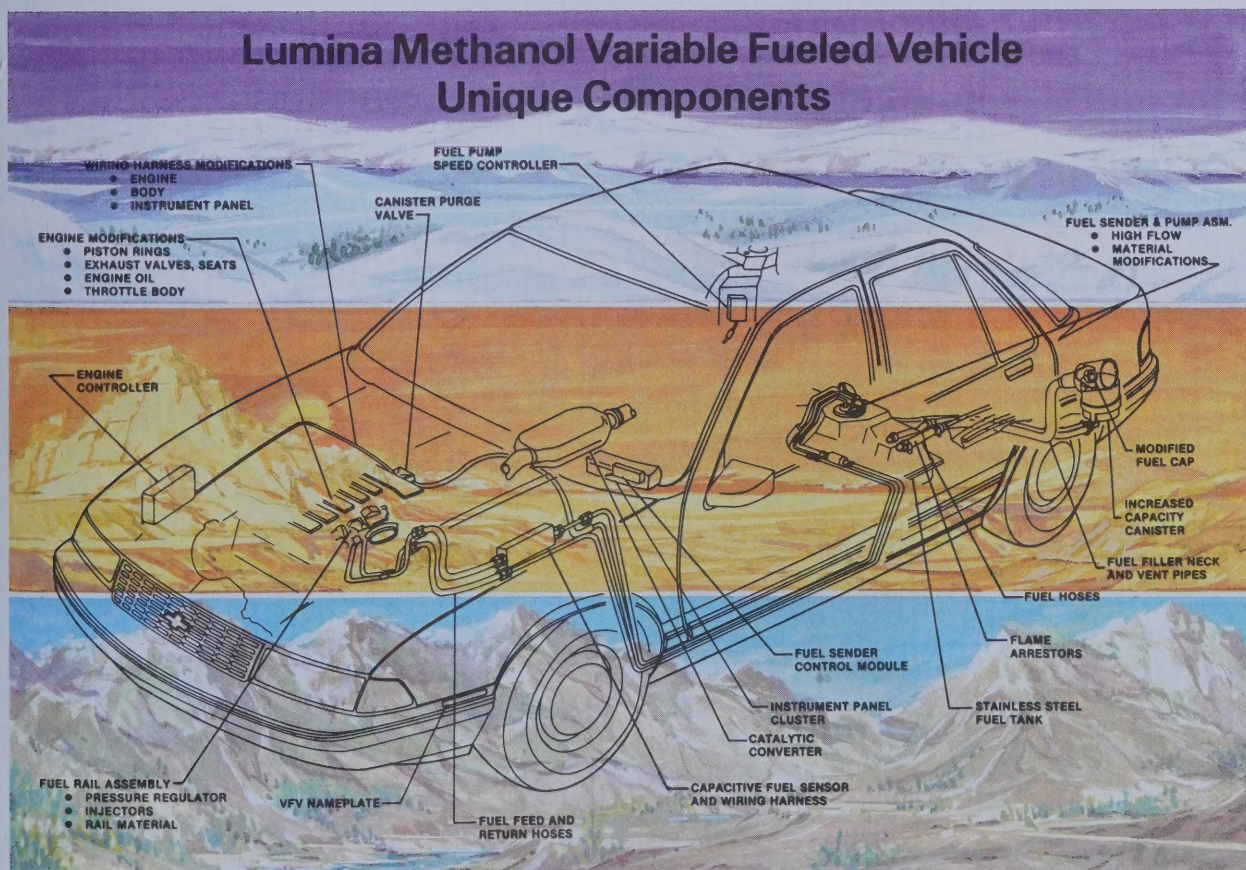


High Altitude Test Centre in Colorado. The system developed by GM permits drivers to choose between operating on methanol, gasoline or a mixture of both, with the car automatically sensing and adjusting for the proper fuel mix.

GM of Canada is also working with other alternative fuels as well as providing technical assistance to Canadian companies which are retrofitting and modifying current and late model vehicles for natural gas and propane use. To supply them with electric power, vans

from our Scarborough Van Plant are being retrofitted with powerful lead-acid batteries and, in cooperation with representatives of the Ontario Ministry of Energy, we are studying the potential for development of electric vehicles.

The objectives of our experiments with a wide variety of available sources of energy are to reduce vehicle emissions, enhance fuel economy and ensure technology is available to adapt to situations of fuel shortages.



*The Oshawa-built methanol-powered Chevrolet Lumina and its unique fuel components.*



# The Four 'Rs' of Waste Management



*General Motors of Canada's Environmental Committee.*

Waste not, want not. By practicing the four 'Rs' of waste management: reduction, reuse, recycling and recovery, General Motors is significantly reducing the amount of waste generated.

We apply innovative methods in the reduction and reuse of the packaging of our incoming production parts. We are working hard to increase the use of returnable plastic and metal containers which are used to cut the amount of waste packaging that would otherwise be disposed of at landfill sites. GMCL recycles steel, cleans and returns drums, recycles oil, solvents, plastics, and batteries. All of these efforts substantially reduce the amount of waste requiring disposal.

At most facilities, cardboard is collected, segregated and recycled. At GM Autoplex broken wooden pallets and mixed burnable waste are burned to produce steam in our Energy From Waste (EFW) facility. The solid

waste is burned in the EFW at a temperature of 1,000 degrees C, with a holding time of one second to ensure complete combustion and a smokeless stack.

Our plants have embarked on a wide variety of recycling projects including those involving pop cans, fine papers, cardboard and wooden pallets. At GMCL's Scarborough Van Plant, aluminum can recycling is up 42 percent this year over last year and Scarborough is currently recycling and reusing over 600 plastic drums which are used as containers for production purposes.

GM Autoplex has provided plastic drums to the Regional Municipality of Durham for use as backyard composters in the community.

General Motors of Canada has made a major commitment to waste management, and is taking positive steps to protect the environment in this manner.



## Cleaner Paint Technologies

The first-ever high production volume waterborne basecoat paint system in the world, located at the Truck Plant in Oshawa, was developed by General Motors of Canada and C-I-L Paints. The dispersing agent in the coloured basecoats of the basecoat/clearcoat paint process is water, resulting in a substantial reduction in volatile organic compound emission levels as well as a very beautiful paint finish. Pigmentation (base colours) are richer and more exotic with waterborne paint systems. As part of its \$450 million modernization program, the Ste. Therese plant also introduced a waterborne basecoat/clearcoat paint complex in 1989.

All of the topcoat paints used in our car and truck assembly plants are now lead-free

as another important step to a safer environment.

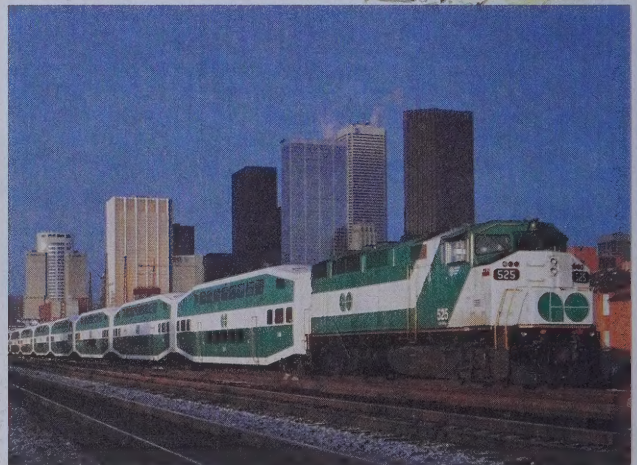
The clearcoats which provide the depth and gloss to the paint finish are now applied electrostatically. Vehicles are negatively charged by grounding, providing a conductive body for the paint. The paint is positively charged, causing an attraction to the vehicle body, reducing emissions caused by overspray. Research and development is currently being done into electrostatic applications of basecoats as well.

These new paint technologies offer the double benefit of more beautiful cars and trucks and a cleaner environment.



*Waterborne basecoat paint is robotically applied at our Oshawa Truck Assembly Plant.*





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- 1 The Windsor Transmission waste-water treatment plant control room.
- 2 Emergency Response Control Unit.
- 3 The Ste. Therese-built Chevrolet Celebrity Wagon finished with waterborne basecoat paint for a cleaner environment.
- 4 An East-bound GO Transit passenger train pulled by a F59PH Locomotive manufactured at London Diesel Division.
- 5 The St. Catharines water treatment and oil recovery facility.
- 6 Aluminum cans being collected in drums to be recycled at the Woodstock Parts Distribution Centre.



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